

## CLAIMS

- 1 1. A manual bone anchor placement device, comprising:
  - 2 a manually actuatable lever;
  - 3 a resilient element;
  - 4 a force translator comprising a distal end and a proximal end, the proximal end  
5 being coupled to the lever and the distal end being coupled to the resilient element, the force  
6 translator transmitting a force exerted on the lever to the resilient element; and  
7 a rotator coupled to the resilient element, the rotator receiving force from the  
8 resilient element and rotating in response thereto.
- 1 2. The manual bone anchor placement device of claim 1, further comprising a securing  
2 element coupled to the rotator, the securing element mating with a bone anchor screw and  
3 rotating when the rotator rotates, thereby applying a torque on the bone anchor screw and placing  
4 the bone anchor screw into bone.
- 1 3. The manual bone anchor placement device of claim 2, wherein the securing element  
2 comprises teeth and wherein the rotator comprises at least one protruding portion capable of  
3 engaging the teeth.
- 1 4. The manual bone anchor placement device of claim 3, wherein the at least one protruding  
2 portion comprises a pawl.
- 1 5. The manual bone anchor placement device of claim 1, further comprising a handle  
2 including a groove for receiving a suture attached to a bone anchor screw.
- 1 6. The manual bone anchor placement device of claim 1, further comprising a connector  
2 with a first end and a second end, the first end coupled to the force translator, and the second end  
3 coupled to the lever.
- 1 7. The manual bone anchor placement device of claim 6, wherein the lever comprises a slot  
2 for receiving the connector.
- 1 8. The manual bone anchor placement device of claim 6, wherein the lever further  
2 comprises a pivot, the connector being positioned below the pivot, and the force translator  
3 receiving a push force when the lever is manually actuated.

- 1    9.    A manual bone anchor placement device, comprising:
- 2                 a manually actuatable lever;
- 3                 a force translator comprising a distal end and a proximal end, the proximal end
- 4    receiving force from the lever;
- 5                 a rack coupled to the distal end of the force translator, receiving force from the
- 6    force translator, the rack moving linearly into an engaging position in response to the force from
- 7    the force translator;
- 8                 a rotator positioned in close proximity to the rack, engaging with the rack when
- 9    the rack moves into the engaging position and rotating in response to engagement by the rack.
- 1    10.   The manual bone anchor placement device of claim 9, further comprising a coupler
- 2    coupled to the rotator for mating with a bone anchor screw, and for rotating when the rotator
- 3    rotates to place the bone anchor screw into bone.
- 1    11.   The manual bone anchor placement device of claim 9, further comprising a handle
- 2    including a groove for receiving a suture attached to a bone anchor screw.
- 1    12.   The manual bone anchor placement device of claim 9, wherein the rotator is selected
- 2    from the group consisting of a ratchet wheel, a pawl, a pinion, and a gear.
- 1    13.   The manual bone anchor placement device of claim 9, further comprising a connector that
- 2    connects the force translator to the lever.
- 1    14.   The manual bone anchor placement device of claim 9, wherein the lever further
- 2    comprises a pivot, the connector being positioned below the pivot, the force translator receiving a
- 3    push force when the lever is manually actuated.
- 1    15.   The manual bone anchor placement device of claim 9, wherein the lever further
- 2    comprises a pivot, the connector being positioned above the pivot, the force translator receiving a
- 3    pull force when the lever is manually actuated.
- 1    16.   The manual bone anchor placement device of claim 9, further comprising a spring that
- 2    encircles an end of the force translator proximal to the rack.
- 1    17.   The manual bone anchor placement device of claim 10, further comprising a spring that
- 2    encircles an end of the coupler proximal to the rotator.

1       18.     The manual bone anchor placement device of claim 9, wherein the distal end of the force  
2     translator comprises a first wedge member, and wherein the device further comprises a tubular  
3     member coupled to the lever, the tubular member having a second wedge member positioned in  
4     close proximity to the first wedge member for transmitting force from the lever to the force  
5     translator through the first wedge member.

1       19.     The manual bone anchor placement device of claim 9, wherein the force translator  
2     comprises a plunger for receiving pneumatic or hydraulic force when the lever is actuated.

1       20.     A manual bone anchor placement device, comprising:

2                  a manually actuatable lever;

3                  a driver rod comprising threads;

4                  a cup coupled to the lever, positioned over the threads of the driver rod, and

5     movable axially along the driver rod upon manual actuation of the lever; and

6                  a washer positioned over the threads of the driver rod, engaging the cup upon

7     manual actuation of the lever, translating force from the lever to the driver rod, and rotating the  
8     driver rod.

1       21.     The manual bone anchor placement device of claim 20, further comprising a coupling  
2     element for mating with a bone anchor screw, and for rotating when the driver rod rotates to  
3     place the bone anchor screw into bone.

1       22.     The manual bone anchor placement device of claim 20, further comprising a force  
2     translating member coupled to the lever at a pivot and coupled to the cup by flanges on the cup,  
3     for translating force from the lever to the cup.

1       23.     The manual bone anchor placement device of claim 20, further comprising a handle  
2     including a groove for receiving a suture attached to a bone anchor screw.

1       24.     The manual bone anchor placement device of claim 20, wherein the washer further  
2     comprises at least one engaging pin for engaging the cup and the cup comprises holes for  
3     receiving the at least one engaging pin.

1    25.    The manual bone anchor placement device of claim 20, wherein the cup further  
2    comprises at least one engaging pin for engaging the washer and the washer comprises holes for  
3    receiving the at least one engaging pin.

1    26.    A buttress-shaped bone anchor screw comprising a micropolished eyelet for receiving a  
2    suture.

1    27.    The bone anchor screw of claim 26, wherein the eyelet is circular, ellipsoidal, or teardrop  
2    shaped.

1    28.    A protective cover for protecting a bone anchor screw comprising a base for engaging  
2    with a bone anchor placement device, a sheath coupled to the base for surrounding and protecting  
3    a bone anchor screw, the sheath being collapsible for uncovering the bone anchor screw when  
4    the bone anchor screw is placed into bone.

1    29.    A kit comprising a flexible, molded sleeve for enclosing a suture therein and at least one  
2    retaining clip for preventing the suture from slipping out of the sleeve.

1    30.    The kit of claim 29, wherein the sleeve further comprises a Teflon<sup>®</sup> material.

1    31.    The kit of claim 29, further comprising a buttress-shaped bone anchor screw comprising a  
2    micropolished eyelet for receiving a suture.

1    32.    The kit of claim 31, wherein the buttress-shaped bone anchor screw is pre-attached to a  
2    suture.

1    33.    The manual bone anchor placement device of claim 1, 9, or 20, further comprising:  
2                 a head assembly;  
3                 a recessed anchor mount movably disposed within the head assembly; and  
4                 an actuation mechanism coupled to the recessed anchor mount.

1    34.    The manual bone anchor placement device of claim 33, wherein the actuation mechanism  
2    is selected from the group consisting of a push wire and a pull wire.

1    35.    The manual bone anchor placement device of claim 33, wherein the actuation mechanism  
2    actuates the recessed anchor mount between a recessed position and an advanced position.

1   36.   The manual bone anchor placement device of claim 33, wherein the anchor mount  
2   includes an outer surface comprising at least one flat surface and the head assembly defines a  
3   core comprising a mating shape.

1   37.   The manual bone anchor placement device of claim 33 further comprising a bone anchor  
2   releasably engaged to the anchor mount.

1   38.   The manual bone anchor placement device of claim 37, wherein the anchor mount  
2   includes a groove for accommodating a suture attached to the bone anchor.

1   39.   A manual bone anchor placement device, comprising:

2                 a handle;  
3                 a shaft extending in a distal direction from the handle;  
4                 a head assembly disposed at a distal end of the shaft;  
5                 a recessed anchor mount movably disposed within the head assembly; and  
6                 an actuation mechanism coupled to the recessed anchor mount.

1   40.   The manual bone anchor placement device of claim 39, wherein the actuation mechanism  
2   is selected from the group consisting of a push wire and a pull wire.

1   41.   The manual bone anchor placement device of claim 39, wherein the actuation mechanism  
2   actuates the recessed anchor mount between a recessed position and an advanced position.

1   42.   The manual bone anchor placement device of claim 39, wherein the anchor mount  
2   includes an outer surface comprising at least one flat surface and the head assembly defines a  
3   core comprising a mating shape.

1   43.   The manual bone anchor placement device of claim 39, wherein the actuation mechanism  
2   is situated within a channel disposed on the handle.

1   44.   The manual bone anchor placement device of claim 39, wherein an actuator operates the  
2   actuation mechanism disposed on the handle.

1   45.   The manual bone anchor placement device of claim 40, wherein the actuation mechanism  
2   comprises a material selected from the group consisting of spring steel and nitinol.

1   46.   The manual bone anchor placement device of claim 39 further comprising a bone anchor  
2   releasably engaged to the anchor mount.

1    47.    The manual bone anchor placement device of claim 39 further including a stop disposed  
2    within the head assembly.